we do not know how to cultivate them, and thirdly because they are all parasites and consequently can only be studied in the living organism.

In regard to their minute size the question may be asked, must they be definitely placed for all time outside the range of microscopic vision or may our optical equipment yet develop to such an extent that we may demonstrate their organism and even smaller particles ?

The theoretical limit of the power of the microscope to demonstrate structure is about 0.25 micron, i. e. one half a wave length of the middle part of the spectrum. Below this magnitude minute particles will no longer show structure but will appear as diffraction discs. The smallest visible particle with the highest power of the microscope, structure being neglected is 0.05 micron so that our organism of contagious pleura pneumonia must be in size somewhere between 0.05 micron and 0.25 micron all the others must be under 0.05 micron. With ordinary methods they must always remain invisible but about a year ago Siedentopf and Zsigmondy, with the assistance of the Zeiss firm constructed an optical device which may lead us some distance in determining the approximate size of these parasites although it will never reveal to us anything of their structure. These investigators wished to study the condition of colloidal gold in the so-called gold ruby glasses. The point to be determined being whether the gold was distributed as discrete particles or continuously through the glass. They approached the question in the same manner as Tyndall many years ago attacked the question of the presence of fine dust particles in the atmosphere, viz., by the use of a fine pencil of sunlight.

By means of a heliostat, a spectroscopic slit aperture and a series of condensing lenses a very fine slit of light was thrown into the glass at right angles to the line of vision. The plane of light was observed by means of a very high power microscope and when this was sharply focussed the light plane appeared as a dark ground filled with enormous numbers of brilliant particles. Each particle showed no structure, simply a diffraction disc due to the light being turned and thrown into the tube of the microscope but nevertheless counts could be made and the size of the particles could be estimated.

The unit of measurement which they take is that used by the physicist and chemist, viz., the millimicron, written  $m\mu_{1005000}$  mm, or  $f_{10}^{1}\sigma_{00}$  micron, and they found the size of the particles in the following manner. It can be demonstrated that the diffraction disc from particles smaller than .006 microns (10000000 mm) would be too small to see, consequently the size must vary between .25 micron and .006 micron. The number in a given cubic area of glass was counted, the amount of